propagation or survival of the species and/or for incidental take in connection with otherwise lawful activities.

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

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Author

The primary author of this proposed rule is Richard G. Biggins, U.S. Fish and Wildlife Service, Asheville Field Office, 100 Otis Street, Room 224, Asheville, North Carolina 28801 (704/259–0321 or FTS 672–0321).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Fish, Marine mammals, Plants (agriculture).

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1543; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h) by adding the following, in alphabetical order under CLAMS, to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
CLAMS							
Pearly mussel, cracking	*Hemistena* (=*Lastena*) *lata*	U.S.A. (AL, IL, IN, KY, OH, TN, and VA)	NA	E	365	NA	NA

Dated: September 13, 1989.

Richard N. Smith,

Acting Director, Fish and Wildlife Service.

[FR Doc. 89–22847 Filed 9–27–89; 8:45 am]

BILLING CODE 4310–55–M

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50 CFR Part 17

RIN 1018–AB 23

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Rhus Michauxii (Michaux's Sumac)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The Service determines *Rhus michauxii* (Michaux's sumac), a dioecious shrub limited to 16 populations in North Carolina and Georgia, to be an endangered species under the authority of the Endangered Species Act of 1973, as amended (Act). *Rhus michauxii* is endangered by suppression of fire, conversion of habitat for silviculture and agriculture, industrial and residential development, highway construction and improvements, hybridization with other species, and geographic isolation of small, single-sex populations. This action implements Federal protection provided by the Act for *Rhus michauxii*.

EFFECTIVE DATE: October 30, 1989.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801.

FOR FURTHER INFORMATION CONTACT: Ms. Nora Murdock, at the above address (704/259–0321 or FTS 672–0321).

SUPPLEMENTARY INFORMATION:

Background

Rhus michauxii, described by C. S. Sargent (1895) from material collected in North Carolina, is a rhizomatous shrub. It is sometimes called "false poison sumac" because of its superficial resemblance of *Rhus vernix*. The erect stems grow from 0.2 to 0.4 meter in height, and the entire plant is densely pubescent. The narrowly winged or wingless rachis supports 9 to 13 sessile, oblong to oblong-lanceolate leaflets that are each 4 to 9 centimetes long, 2 to 5 centimeters wide, and acute to acuminate. The bases of the leaflets are rounded, and their edges are simply or doubly serrate. Flowering in this dioecious species occurs in June. The small flowers are borne in a terminal, erect, dense cluster, with each one being four- to five-parted and greenish-yellow to white. The fruit, which is a red,

densely short-pubescent drupe, 5 to 6 millimeters broad, is borne on female plants from August to September (Radford *et al.* 1964, Cooper *et al.* 1977, Sargent 1895). *Rhus michauxii* differs from other similar species of the genus by its short stature, dense overall pubescence, and evenly serrate leaflets.

Rhus michauxii is a species endemic to the inner coastal plain and lower piedmont of North Carolina, South Carolina, and Georgia, where it is currently known from 15 locations in North Carolina and 1 location in Georgia. The species occurs in sandy or rocky open woods, perhaps in association with basic soils (Cooper *et al.* 1977), and appears to be dependent upon some form of disturbance to maintain the open quality of its habitat. Artificial disturbances, such as railroad and highway right-of-way maintenance, are maintaining some of the openings historically provided by naturally occurring periodic fires. Thirty-two populations of *Rhus michauxii* have been reported historically from 23 counties in North Carolina, South Carolina, and Georgia. Sixteen of these populations remain in existence in North Carolina and Georgia. The following is a summary of the most current information for this species.

Georgia: Five populations were reported historically in the State from the counties of Cobb, Newton, Rabun, Columbia, and Elbert. Only the Elbert County population is known to remain, with just four plants surviving. The site is on land owned by the U.S. Army Corps of Engineers, leased to the Georgia Department of Natural Resources as part of the Board River Wildlife Management Area (T. Patrick, Georgia Heritage Inventory, personal communication, 1988). The Newton County population is believed to have been destroyed during the construction of a water tower. Causes for the disappearance of the populations in Rabun, Cobb, and Columbia Counties are not known.

South Carolina: Two populations were reported historically from Florence and Kershaw Counties. Although extensive searches have been conducted in these areas and other areas of potentially suitable habitat, the species is believed to have been extripated from the State.

North Carolina: Rhus michauxii was once known to occur at 25 sites in this State. The species has been extirpated at 10 of these localities, with the causes for extirpation being largely unknown. One population is believed to have been extirpated in each of the following counties. Orange, Wake, Wilson, Robeson, Moore, Lincoln, Franklin, Durham, Mechlenberg, and Hoke. The distribution of the 15 extant populations by county is as follows. Three populations remain in Hoke County. One of these sites, with several hundred female plants, is privately owned; another, with 23 plants, is located on Ft. Bragg Military Reservation and is owned by the U.S. Department of Defense; and the third, a severely disturbed site where only four plants remain, is partially in private ownership and partially owned by the Nature Conservancy.

Six populations occur in Richmond County. One of these (consisting of 2 plants) is privately owned, and 4 (3 with less than 50 plants each and one with 137 plants) are located on land administered by the North Carolina Wildlife Resources Commission as part of the Sandhills Gamelands. The sixth population, with only eight plants, is on Ft. Bragg Military Reservation, owed by the U.S. Department of Defense.

Two populations occur in Scotland County on the Sandhills Gamelands, which are administered by the North Carolina Wildlife Resources Commission. Both of these populations are large, with 1 covering an area of 76 meters by 137 meters, but containing only female plants. The other consists of 300 to 400 male plants.

One population survives in each of the following counties: Franklin, Davie, Robeson, and Wake. The Franklin County population is privately owned and contains over 250 plants of both sexes. The Davie County population, also in private ownership, consists of about 30 plants covering a 0.9-meter square area. The Robeson County population, in private ownership, consists of several hundred male plants. The Wake County population, owned by the City of Raleigh, consists of 279 plants of both sexes.

Many of these populations are in vulnerable locations, such as highway rights-of-way or on the edges of plowed fields. Those that are not adjacent to some maintained opening or that are not exposed to periodic disturbance are endagnered by natural succession.

On December 15, 1980, the Service published a revised notice of review for native plants, in the **Federal Register** (45 FR 82480); *Rhus michauxii* was included in that notice as a category 1 species. Category 1 species are those for which the Service presently has sufficient information on hand to support the biological appropriateness of their being listed as endangered or threatened species. Subsequent revisions of the 1980 notice have maintained *Rhus michauxii* in cagegory 1.

On January 6, 1989, the Service published in the **Federal Register** (54 FR 441) a proposal to list *Rhus michauxii* as an endangered species.

Summary of Comments and Recommendations

In the January 6, 1989, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper notices inviting public comment were published in the "Athens News" (Athens, Georgia) on January 28, 1989, in the "Fayetteville Times" (Fayetteville, North Carolina) on January 28, 1989, and in the "Raleigh News and Observer" (Raleigh, North Carolina) on January 29, 1989.

Eleven comments were received. Of these, seven respondents expressed support for the proposal, including the Natural Heritage Program of the North Carolina Department of Natural Resources and Community Development, the Plant Conservation Program of the North Carolina Department of Agriculture, the Georgia and South Carolina State offices of The Nature Conservancy, the Corps of Engineers (Wilmington District), the Georgia Department of Natural Resources, and the World Conservation Monitoring Centre. The remaining four comments offered additional information but stated no position on the proposal. All of the new information supplied by these 11 comments has been incorporated into appropriate sections of the final rule.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that *Rhus michauxii* should be classified as an endangered species. Procedures found at section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Rhus michauxii* Sargent (Michaux's sumac) are as follows:

A. *The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range*

Rhus michauxii has been and continues to be endangered by destruction or adverse alteration of its habitat. Since discovery of the species, 50 percent of the known populations have been extirpated, partly as a result of conversion of habitat for silvicultural and agricultural purposes and for industrial and residential development. Fire suppression appears to be a problem for this species and will be discussed in detail under Factor E below. Of the 16 populations that have been extirpated, 1 is known to have been eliminated by industrial development and 1 by conversion of the site to pine plantation. Causes for extirpation of the others are unknown. Many of the remaining populations are on the edges of highway or railroad rights-of-way or cultivated fields. Fourteen of the 16 remaining populations are currently threatened by habitat alteration.

In addition to the major threats listed above, those populations on military land are potentially threatened by mechanized military training activities. Although this has not been a documented problem for this species thus far, some of the small sites occupied by the species could easily be destroyed by heavy, tracked vehicles such as tanks. Nontheless, populations probably persist on military lands and State gamelands where they have not survived on adjacent privately owned land because of the prescribed burning programs of the Defense Department and the North Carolina Wildlife Resources Commission, and periodic fires incidental to military training (J. Carter, North Carolina State University, personal communication, 1987; J. Moore, North Carolina Natural Heritage Program, personal communication, 1987). Activities associated with intensive timber management on publicly owned land, such as timber harvesting, road building, and conversion of habitat to pine plantation, if done in a manner not consistent with the protection of *Rhus michauxii* populations, could adversely affect the species, as has been the case on private lands in the past.

B. *Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*

Rhus michauxii is not currently a significant component of the commercial trade in native plants. However, because of its small and easily accessible populations, it is vulnerable to taking and vandalism that could result from increased publicity.

C. Disease or Predation.

Not applicable to this species at this time.

D. The Inadequacy of Existing Regulatory Mechanisms

Rhus michauxii is afforded legal protection in North Carolina by North Carolina General Statutes, § 106–202.12 to 106–202.19 (Cum. Supp. 1985), which provide for protection from intrastate trade (without a permit) and for monitoring and management of State-listed species, and which prohibit taking of plants without written permission of landowners. *Rhus michauxii* is listed in North Carolina as endangered and of special concern (Sutter *et al.* 1983). The species is recognized in South Carolina as extirpated in the State and of national concern by the South Carolina Advisory Committee on Rare, threatened, and Endangered Plants in South Carolina; however, this State offers no official protection. The species is not listed by the State of Georgia where it was thought to have been extirpated until very recently. State prohibitions against taking are difficult to enforce and do not cover adverse alterations of habitats, such as exclusion of fire. The Endangered Species Act would provide additional protection and encouragement of active management for *Rhus michauxii.*

E. Other Natural or Manmade Factors Affecting Its Continued Existence

As mentioned in the "Background" section of this rule, many of the remaining populations are small in numbers of individual stems and in area covered by the plants. Of the 16 remaining populations, 9 have less than 100 plants, with 3 of these containing less than a dozen plants each. The rhizomatous nature of the species indicates that there are many fewer individual plants in existence than stem counts would indicate. In addition, only two of the remaining populations contain both male and female plants. The dioecious nature of the species further increases the vulnerability of extremely small populations where plants of only one sex remain. Existing conditions at most of the occupied sites are indicative of low genetic variability within populations, which makes it more important to maintain as much habitat and as many of the remaining colonies, particularly those containing both sexes, as possible. The North Carolina Natural Heritage Program's response to the proposed rule stated that, because of the clonal nature of this species and the scarcity of populations containing both male and female plants, the remaining "populations" may actually consist of only about two dozen genetic individuals; "considering the profound threats to its habitat and that the total remaining population of Michaux's sumac is almost certainly below fifty, a stronger case for Federal listing can hardly be made." The North Carolina Plant Conservation Program's response echoed this assessment of the species' status and stated further that *Rhus michauxii* is one of the "* * * most endangered species in North Carolina * * *" and "* * * is severely threatened by suppression of fire, development, and geographic isolation of single sex populations."

Another potential threat to this species, particularly in populations where only a few plants remain, is hybridization with sympatric species such as *Rhus glabra* and *Rhus copallina.* Hardin and Phillips (1985) documented the existence of an intermediate form between *Rhus glabra* and *Rhus michauxii* in at least two sites from which *Rhus michauxii* had been reported. Much remains unknown about the demographics and reproductive requirements of this species. Fire or some other suitable form of distrubance, such as mowing or careful clearing, appears to be essential for maintaining the open habitat preferred by *Rhus michauxii.* Without such periodic disturbance, this type of habitat is gradually overtaken and eliminated by the shrubs and trees of the adjacent woodlands. As the woody species increase in height and density, they overtop the *Rhus michauxii,* which is shade-intolerant. The current distribution of the species is ample evidence of its dependence on disturbance. Of the 16 remaining populations, 11 are on roadsides or in the edges of artifically maintained clearings. Two others are in areas that have been exposed to periodic fire, another is in a natural opening on the rim of a Carolina bay (shallow, elliptical depression of unknown origin); the remaining two are in wooded sites and are declining in vigor (J. Moore, personal communication, 1988; T. Patrick, personal communication, 1988).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to make this rule final. Based on this evaluation, the preferred action is to list *Rhus michauxii* as endangered. With half of the species' populations already having been eliminated and only 16 remaining

in existence (with most of these being very small in size and containing plants of only one sex), and based upon its dependence on some form of active management, it warrants protection under the Act. Endangered status seems appropriate because of the imminent serious threats facing most populations. As stated by Hardin and Phillips (1985), "*Rhus michauxii* is apparently on the verge of extinction * * *." Critical habitat is not being designated for the reasons discussed below.

Critical Habitat

Section 4(a)(3) of the Act requires, to the maximum extent prudent and determinable, that the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for *Rhus michauxii* at this time. As discussed under Factor B in the "Summary of Factors Affecting the Species" section, *Rhus michauxii* is vulnerable to taking, an activity difficult to enforce against and only regulated by the Act with respect to plants in cases of (1) removal and reduction to possession, of listed plants from lands under Federal jurisdiction, or their malicious damage or destruction on such lands; and (2) removal, cutting, digging up, or damaging or destroying in knowing violation of any State law or regulation, including State criminal trespass law. Such provisions are difficult to enforce, and publication of critical habitat descriptions and maps would make *Rhus michauxii* more vulnerable and would increase enforcement problems. All involved parties and principal landowners have been notified of the locations and importance of protecting this species. Protection of this species' habitat will be addressed through the recovery process and through the Section 7 jeopardy standard. Therefore, it would not be prudent to determine critical habitat for *Rhus michauxii*.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. Such actions are initiated by the Service following listing. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to any critical habitat. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

The U.S. Department of Defense has jurisdiction over portions of this species' habitat. Federal activities on these and other Federal and private lands that could impact *Rhus michauxii* and its habitat in the future include, but are not limited to, the following: silvicultural activities, including timber harvesting and conversion of sites to pine plantations by means of mechanical site preparation; mechanized military training operations; recreational development; power line construction and certain types of maintenance/improvements; highway construction and certain types of maintenance/improvements; and permits for mineral exploration and mining. The Service will work with the involved agencies to secure protection and proper management of *Rhus michauxii* while accommodating agency activities to the extent possible.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 set forth a series of general trade prohibitions and exceptions that apply to all endangered plants. With respect to *Rhus michauxii*, all trade prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61, apply. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export the species, transport it in interstate or foreign commerce in the course of commercial activity, sell or offer it for sale in interstate or foreign commerce, or remove and reduce the species to possession from areas under Federal jurisdiction. In addition, the 1988 amendments (Pub. L. 100-478) to the Act prohibit the malicious damage or destruction of listed plants on Federal lands, and the removal, cutting, digging up, or damaging or destroying of these plants in knowing violation of any State law or regulation, including State criminal tresspass law. Certain exceptions apply to agents of the Service and State conservation agencies. The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered species under certain circumstances. It is anticipated that few trade permits would ever be sought or issued, since *Rhus michauxii* is not common in cultivation or in the wild. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, P.O. Box 3507, Arlington, Virginia 22203 (703/358-2104).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

Cooper, J., S. Robinson, and J. Funderburg. 1977. Endangered and threatened plants and animals of North Carolina; proceedings of the symposium on endangered and threatened biota of North Carolina. North Carolina State Museum of Natural History, Raleigh, North Carolina. 61 pp.

Hardin, J., and L. Phillips. 1985. Hybridization in eastern North American Rhus (Anacardiaceae). Association of Southeastern Biologists Bulletin 32(3):99-106.

Radford, A., H. Ahles, and C. Bell. 1964. Manual of the vascular flora of the Carolinas. University of North Carolina Press, Chapel Hill. 678 pp.

Sargent, C.S. 1895. New or little-known plants; *Rhus michauxii*. Garden and Forest 398:404-405.

Sutter, R., L. Mansberg, and J. Moore. 1983. Endangered, threatened, and rare plant species of North Carolina: a revised list. Association of Southeastern Biologists Bulletin 30:153-163.

Author

The primary author of this proposed rule is Ms. Nora Murdock, Asheville Field Office, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801 (704/259-0321 or FTS 672-0321).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Fish, Marine mammals, Plants (agriculture).

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1543; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.12(h) by adding the following, in alphabetical order, to the List of Endangered and Threatened Plants:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
* * * * * * *						
Anacardiaceae—Cashew family:						
Rhus michauxii	Michaux's sumac	U.S.A. (NC, SC, GA)	E	366	NA	NA
* * * * * * *						

Dated: September 13, 1989.

Richard N. Smith,

Acting Director, Fish and Wildlife Service.

[FR Doc. 89–22848 Filed 9–27–89; 8:45 am]

BILLING CODE 4310–55–M

50 CFR Part 17

RIN 1018–AB23

Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Eastern and Western Prairie Fringed Orchids

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service determines *Platanthera leucophaea* (Eastern prairie fringed orchid), and *Platanthera praeclara* (Western prairie fringed orchid) to be threatened species under authority of the Endangered Species Act (Act) of 1973, as amended. Both species have been extirpated throughout much of their former ranges by conversion of habitat for crop fields, grazing, intensive and continuous hay mowing, drainage, fire protection activities, and subsequent decline of prairie habitat. *P. leucophaea* remains extant in approximately 52 populations in seven States and two Canadian Provinces; however, many of these are small, unprotected, and unmanaged populations. *P. praeclara* remains extant in about 37 populations in seven States and one Canadian Province; many of these are small hay meadow populations, where plants are annually cropped before seeds are dispersed. This section will implement Federal protection provided by the Act for *Platanthera leucophaea* and *P. praeclara.*

DATE: Effective date of this rule is October 30, 1989.

ADDRESS: The complete file for this rule is available for inspection by appointment during normal business hours at the Service's Regional Office of Endangered Species, Federal Building, Fort Snelling, Twin Cities, Minnesota 55111.

FOR FURTHER INFORMATION CONTACT: James M. Engel, Endangered Species Coordinator at the above address (612/725–3276 or FTS 725–3276).

SUPPLEMENTARY INFORMATION:

Background

The prairie fringed orchids, *Platanthera leucophaea* and *P. praeclara* are closely related members of the orchid family and are referred to as a species pair (Sheviak and Bowles 1986). Prior to description of *P. praeclara* the two species were considered as *P. leucophaea*, with a total range including 21 states and two provinces (Correll 1950, Luer 1975). Their joint distribution pattern extends from Oklahoma north to Manitoba, and east in a narrowing peninsula through the Great Lakes states to Maine. Populations also range westward through Nebraska in groundwater maintained habitats. *P. leucophaea* occurs primarily east of the Mississippi River, while *P. praeclara* is restricted to west of the Mississippi (Sheviak and Bowles 1986). Both species require full sunlight and usually inhabit tall grass calcareous silt loam or sub irrigated sand prairies. In the east, *P. leucophaea* also occupies calcareous wetlands, including open portions of fens, sedge meadows, marshes, and bogs (Bowles 1983).

The prairie fringed orchids are perennial herbs which regenerate from a fusiform tuber rootstock. Their tubers are dormant during winter and thus are adapted to dormant season prairie fires; such fires and high precipitation levels appear to promote flowering (Sheviak 1974, Roosa and Eilers 1979, Bowles 1983, Currier 1984). Leaves and an inflorescence (if flower primordia were set the prior year) usually emerge in May, and flowering begins by late June to early July. These species are characterized by large white flowers (the largest in the genus) arranged in an inflorescence that may reach 12 decimeters (47 inches) high with up to 40 flowers. The flowers are fragrant after sunset and adapted to pollination by night flying hawkmoths which ingest a high volume nectar resource from long nectar spurs (Bowles 1983). Pollination is required for seed production, while seedling establishment depends upon development of mycorrhizae with a favorable soil inhabiting fungus (reviewed in Bowles 1983). Differences in flower structures and pollination mechanics serve to isolate the species from hybridization; these features can be used to identify living or preserved specimens (Sheviak and Bowles 1986). The western species has larger flowers adapted to placing pollinia (pollen masses) on the compound eyes of visiting pollinators In contrast, the eastern species places pollinia on the proboscis of visiting moths.

Platanthera leucophaea has declined over 70 per cent from original county records and now has about 52 extant populations in seven states. Primarily due to the destruction of large grasslands east of the Mississippi River, extremely large or extensive populations of this orchid do not exist in the United States. In Canada, 12 populations are known from fens and prairies in 12 Ontario counties; one fen population is estimated at 2000 plants (Brownell 1984).